Comments on Compensatory Mitigation Methods

Traditional Ratio Method

$$\text{Mitigation Ratio} \equiv \frac{\text{Mitigation Acres}}{\text{Adverse Affects Acres}}$$

The Mitigation Ratio method is often based on personal judgment with little or no objective criteria justifying the ratio. This can lead to widely differing results depending upon who evaluates the mitigation plan.

Identified Problems with this method include:

- Important factors such as success criteria, monitoring plans, contingencies, restrictive covenants, location, etc., have little or no affect on the ratio.
- Applicants have no policy which they can rely upon to develop a mitigation plan prior to submitting an application.
- This method can be quick in developing a ratio. But it can cause delays in getting agreement and resolving comments when objections are made to the ratio chosen. The mitigation ratios developed can be difficult to justify, ecologically unreliable, controversial, and inconsistent from project to project.

Note: This paper is an informal "talking outline" developed for presentations, etc. Please send any comments, improvements, or suggestions to:

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Mitigation Equation Method

$$\text{Proposed Mitigation Credits} \geq \text{Required Mitigation Credits}$$

$$\text{PMC} \geq \text{RMC}$$

$$(\text{M} \times \text{Mitigation Acres}) \geq (\text{R} \times \text{Adverse Impacts Acres})$$

The Charleston District Corps of Engineers began developing this method in 1991. A Standard Operating Procedure (SOP) titled "Compensatory Mitigation" was subsequently written and implemented in South Carolina based on this method. The SOP has also been adapted by the Savannah District Corps of Engineers for use in Georgia. The SOP includes tables used for calculating the M and R factors. The R factor is calculated based on an evaluation of the requested adverse impacts. Similarly, the M factor is based on the proposed mitigation.

Factors used in calculating R include:

- type and duration of impacts
- type and condition of impacted site (functions & values)
- rarity of impacted ecosystem
- magnitude of impacts (cumulative effects)

Factors used in calculating M include:

- alterations to aquatic characteristics (soils, hydrology, vegetation)
- changes in functions and values (net improvement)
- monitoring and contingencies plans
- kind of ecosystem compared to impacts
- location (i.e. watershed and ecoregion) relative to impacts
- preservation methods (e.g. restrictive covenants, easements)
- degree of threat for preservation proposals

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Some Benefits of the Mitigation Equation Method

- Eliminates the "re-inventing the wheel" syndrome. All projects and mitigation proposals are evaluated consistently. Unique or modified procedures are not required for each project or category of projects.

- Minimizes discrepancies between project managers with varying levels of experience, expertise, and individual bias. After minimal training and practice, project managers are able to apply the method with a high degree of consistency.

- Adverse impacts can be evaluated independent of the proposed mitigation. Thus, an applicant can be told how many mitigation credits an impact will require prior to evaluating a mitigation plan.

- Provides a reliable tool which developers and planners can use to compare mitigation options.

- Allows unlimited mixing of mitigation locations, and types (e.g. restoration, preservation, enhancement).

- Allows mixing of banking and non-banking mitigation.

- Provides a credit calculation and accounting methodology which works for mitigation banking, fee based mitigation, and project specific mitigation.

- Developed in coordination with state and federal agencies. Thus, there are rarely disagreements with agencies over mitigation when the method is used.

- Minimizes arguments about mitigation with applicants by giving both the project manager and the applicant a written framework for evaluating the impacts and the mitigation plan.

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Relationship of Equation Method to Mitigation Ratios

$$PMC \geq RMC$$

$$(M \times \text{Mitgation Acres}) \geq (R \times \text{Adverse Affects Acres})$$

$$\frac{\text{Mitigation Acres}}{\text{Adverse Affects Acres}} \geq \frac{R}{M}$$

$$\text{Required Mitigation Ratio} \geq \frac{R}{M}$$

For example, if we have an all restoration mitigation proposal with:

$$\text{Adverse Affects Multiplier (R value)} = 6.0$$
$$\text{Mitigation Multiplier (M value)} = 2.0$$

Then the resulting Required Mitigation Ratio would be calculated as:

$$2.0 \times \text{Restoration Mitigation Acres} \geq 6.0 \times \text{Adverse Affects Acres}$$
$$\text{Mitigation Acres} \div \text{Adverse Affects Acres} \geq 6.0 \div 2.0$$
$$\text{Minimum Required Mitigation Ratio} = 3.0$$

The value of R increases with an increase in the adverse impacts. Similarly, the value of M increases with an increase in the mitigation proposed. Also, as shown above, given a constant R value, the mitigation ratio decreases when M increases. And, given a constant M value, the Mitigation Ratio increases with an increase in the R value. This relationship is shown as follows.

Mitigation Ratio	**Adverse Affects (R)**	**Mitigation (M)**
Higher	High	Low
↑	↑	↓
Lower	Low	High

Comments on Compensatory Mitigation Methods

Mitigation Evaluation Sequence

It should be understood that the traditional method and the mitigation equation method are both applied using the same sequence of steps. These steps are as follows.

1. Impacts Analysis.
It must be determined that the requested impacts can be authorized, if suitable mitigation is offered. A "suitable" plan is one which includes acceptable quality and quantity of mitigation and which meets applicable policies and guidelines.

2. Mitigation Quality Analysis.
It must be determined that the general quality of the mitigation is acceptable. The "quality" decision is discretionary and is not based on quantitative factors. Certain general guidelines are usually available which are used in making this decision. For example, creation of ponds as mitigation for filling wetlands may be against the guidelines. However, it is impossible to provide all encompassing guidelines on all quality issues. Generally, the quality issue can be decided based on the answer to the following question.

- Is the plan likely to succeed?
- Is it enforceable?
- Is it appropriate?
- Is it ecologically beneficial?

If the answer to any of these, or similar questions, is no, then the plan may be of unacceptable quality and should be rejected. Examples of plans that might be rejected based on a quality analysis include:

Creation of salt marsh in the middle of a desert. (unlikely to succeed)

Restrictive covenant's on property the permittee doesn't own. (use conservation easement)

Out-of-watershed preservation in another state. (may be inappropriate)

3. Mitigation Quantitative Analysis.
After the two tests shown above have been passed, then the mitigation plan is evaluated quantitatively. This is done using the mitigation equation method given in the SOP.